

A NEW LINGUATULID, ARMILLIFER YOSHIDAI,
WITH NOTES ON THE PORECEPHALIDÆ

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ONE PLATE

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Through the kindness of Prof. Yoshida of the Pathological Institute of Osaka Medical College, I have had an opportunity of examining some interesting material of Linguatulida, which were obtained by him from a giant snake, which had been kept in Tennoji Zoological Park of Osaka and died on March 29, 1927. As far as my knowledge goes, this is certainly a new form, and so I shall give a description of it under a new name.

Armillifer yoshidai n. sp.

The holotype is an adult female collected by Dr. Sadawo Yoshida from the lung of a giant snake, March 30, 1927, and is now in preservation in the author's collection as an alcoholic specimen.

Host: *Python molurus* (Linnaeus, 1766).

Habitat: lungs of the host.

Measurements. The length of the body is 76.5 mm. The cephalothorax measures 3.0 mm. in length, 4.5 mm. in breadth and 4.5 mm. in height. The abdomen measures 73.5 mm. in length, 5.0 mm. in breadth and 4.0 mm. in height at widest anterior part.

The body is much elongate, subcylindrical and slightly curved ventrally.

The cephalothorax is somewhat wedge-shaped, sloping forwards. Its dorsum is distinctly convex, but the ventre is flat or more or less concave. It is obtuse at the anterior margin, but arcuated at the base. Two prominent papillæ are placed on its

anterior border. Other smaller papillæ are not distinctly visible though they are located below the inner leg-pouches, above and below the outer leg-pouches and also at the back and sides.

The mouth on the middle line about 1.5 mm. behind the anterior margin is orbicular and is lipped by a chitinous armature.

The leg-pouches being two on either side are placed on a line with the mouth. All the legs are similar in size and shape each being provided with a robust and at the same time strongly curved chitinous hook which measures about 1.5 mm. in length. These hooks are hollow, transparent and of bright amber-yellow in color.

The abdomen is convex dorsally but flattened ventrally at the anterior one-fifth. It is, however cylindrical in the posterior four-fifths being thickened forwards but gradually tapers backwards, terminating in an acute cone-like annulus. It is encircled by prominent, bracelet-like rings placed at intervals obliquely, so that the whole worm presents an appearance akin to a screw. The seven anterior rings locating near the cephalothorax are so closely approximated, narrow and faintly limited by shallow and indistinct linear furrows that it renders a considerable hard work to make out the actual number of the abdominal annuli.

The alimentary tract runs axially in an almost perfect straight line from mouth to anus. At beaded part, it is closely packed by the coiled utero-vaginal canal.

The anus lies at the posterior end of the terminal annulus. About 1 mm. anterior to the anus on the mid-ventral side of the terminal annulus, there is the opening of the vagina.

13 paratypes are almost similar to the holotype. One of which is now preserved in the Zoological Museum of Agricultural Faculty, Tokyo Imperial University. 12 other paratypes are preserved in the museum of the Pathological Institute of Osaka Medical College.

A paratypic specimen in possession of the Agricultural Faculty shows the following characters.

Measurements: The length of body is 78.0 mm. The cephalothorax measures 4.0 mm. in length, 4.5 mm. in breadth and 4.0 mm. in height. The abdomen is 74.0 mm. long, 5.5 mm. broad and 3.5 mm. high at the anterior part.

The abdomen shows thirty annuli, of which the anterior five can hardly be made out.

The allotype is an adult male almost like the holotype.

Measurements are as follows. The length of the body is 33.0 mm. The cephalothorax measures 2.5 mm. in length, 3.0 mm. in breadth and 2.0 mm. in height. The Abdomen is 30.5 mm. long, 3.3 mm. broad and 3.0 mm. high at the anterior wider part.

The male is decidedly smaller than the female and strongly tapers backwards. The annulation of the abdomen is marked by thick prominent bands in each annulus but to a less degree than in the female. The annuli are thirty in number as in the female and distinct through the whole length of the abdomen on account of the presence of the ventro-lateral processes unlike the female.

The sexual opening lies at the anterior end of the first abdominal encirclet on the mid-ventral line.

The color of the body is the same in both sexes, being ivory-white in the preserved condition.

Remarks: The resemblance between this new species and *Armillifer moniliformis* (Diesing, 1835) Sambon, 1922, is so striking as to their bead-like appearance and structure, that one may easily mistake one for the other. The most important differential characters are the number of the annuli which are thirty in both sexes, and the shape of transverse section of the abdomen at the anterior part.

Porocephalidæ nov. fam.

Type genus: *Porocephalus* Humboldt, 1811

Family diagnosis: The hook-like legs are disposed archwise instead of in trapezoidal formation. In the transverse section of body, the alimentary tract is seen in the central or a little dorsal portion of it. There is no latero-ventral grooves. On this point this family is distinguishable from Sebekiidæ, to which *Sebekia*, *Leiperia*, *Alofa* and *Sambonia* belong.

This family is divided into two subfamilies by the condition of abdominal annulation.

400

KYUKICHI KISAYDA

Subfamilia Porocephalinae Sampon, 1922 (restr.)

Type genus: *Porocephalus* Humboldt, 1811

Subfamily diagnosis: The body is subcylindrical, more or less flattened, and smooth abdominal anuli present.

Known genera: Four genera, namely, *Porocephalus*, *Cayerina*, *Waddycephalus* and *Kiricephalus* are on record.

Armilliferinae nov. subfam.

Type genus: *Armillifer* Sampon, 1922

Subfamily diagnosis: The body is elongate and cylindrical in shape. Each of the abdominal annulus is strongly marked by a prominent band, the terminal annulus being conical.

Genus *Armillifer* Sampon, 1922

Type species: *Armillifer armillatus* (Wyman, 1847) Sampon, 1922 = *Linguatula armillata* Wyman, 1847

Generic diagnosis: No sharp demarkation exists between the cephalothorax and abdomen.

Known species: Three species have been recorded: *Armillifer armillatus* (Wyman, 1847), *A. moniliformis* (Diesing, 1835). [sub; *Pentastoma*], and *A. yoshidai* Kishida, 1928

Cubirea nov. gen.

Type species: *Cubirea annulata* (Baird, 1853) Kishida, 1928, nov. comb. = *Pentastoma annulatum* Baird, 1853

Generic diagnosis: The cephalothorax is followed by a narrow neck-like constriction which precedes the main part of the beaded abdomen.

Known species: Monotypic.

Key to the genera and species of the subfamily
Armilliferinae Kishida, 1928.

- A. No sharp distinction between the cephalothorax and abdomen exists. The number of encircles at the anterior part of abdomen is indistinct. Genus *Armillifer*.

ARMILLIFER YOSHIDAI, A LINGUATULID

401

- B. Abdomen tapering gradually backwards. The number of encircles ranging 16–26 in the males, and 18–23 in the females *Armillifer armillatus*.
- BB. Abdomen strongly tapering backwards. The number of encircles is greater than in *A. armillatus*.
 - C. The number of abdominal annuli variable, being 26 in the males and 28–35 in the females
. *Armillifer moniliformis*.
 - CC. The number of abdominal encircles is constant, being 30 in both sexes *Armillifer yoshidai*.
- AA. Cephalothorax is followed by a very narrow neck-like part of the abdomen Genus *Cubirea*.
 - B. With 30 abdominal annuli *Cubirea annulata*.
 - BB. With 32 abdominal annuli *Cubirea pomeroyi*.

LIST OF PAPERS CITED

- Leuckart, R. 1860 Bau und Entwicklungsgeschichte der Pentastomen. Leipzig und Heidelberg.
- Lohrmann, E. 1889 Untersuchungen über den anatomischen Bau der Pentastomen. Arch. f. Naturg., Jg. 55, S. 303-386.
- Stiles, C. W. 1891 Bau und Entwicklungsgeschichte von *Pentastomum proboscideum* und *P. subcylindricum*. Ztschr. f. Wiss. Zool., Bd. 52, Heft 1, S. 85-157.
- Spencer, W. B. 1893 The anatomy of *Pentastomum teretiusculum*. Quart. Journ. Mier. Sci. vol. 34, New Series, pp. 1-73.
- Ward, H. 1899 On *Reighardia*, a new genus of Linguatulidæ. Proc. Amer. Assoc. for the Adv. of Sci. p. 254.
- Koch, M. 1906 Zur Kenntnis des Parasitismus der Pentastomen. Arbeiten aus den pathologischen Institut zu Berlin.
- Sambon, L. W. 1910 Porocephaliasis in man. Journ. Trop. Med. and Hyg. vol. 13-16.
- Noc et Nogue. 1919 Note sur un cas de porocephalose. Bull. Soc. Med. Chir. Franc. Ouest Afr., tome 1, pp. 6-9.
- Mouziols, Coollognon et Roy. 1920 Un cas d'ictere graves suivi de mort et cause chez un Senegalais par le *Porocephalus armillatus*. CR. Soc. Biol., tome 88.
- Sambon, L. W. 1922 A synopsis of the family Linguatulidæ. Journ. Trop. Med. and Hyg. vol. 25, no. 12, pp. 188-206.
- Noc and Giglioli. 1922 Linguatulids parasitic in monitors. The new genus *Sambonia*. Journ. Trop. Med. and Hyg., vol. 25, no. 17, pp. 276-280.
- Heymons, R. 1922 Beitrag zur Systematik und Morphologie der Zungenwürmer. Zool. Anz. Bd. 55, S. 154.
- Haffner, K. von. 1922 Beiträge zur Kenntnis der Linguatuliden. Zool. Anz., Bd. 54.
- Martini, E. 1923 Lehrbuch der medizinischen Entomologie. Jena, S. 267-269.
- Haffner, K. von. 1924 Über den Hoden und die Spermatocystenbildung von *Porocephalus moniliformis*. Zool. Anz., Bd. 58, S. 285-290.
- Haffner, K. von. 1924 Die Körpermuskulatur von *Porocephalus armillatus*. Zool. Anz. Bd. 59, S. 270-276.
- Haffner, K. von. 1924 Die Drüsen von *Porocephalus armillatus*. Zool. Anz. Bd. 60, S. 126-136.

ARMILLIFER YOSHIDAI, A LINGUATULID

403

Hett, Mary L. 1924 On the family Linguatulidae. P. Z. S. London Pt. 1, pp. 107-159.

Heymons, R. 1926 Pentastomida. Kükenthal und Krumbach's Handbuch der Zoologie. Bd. 1, S. 69-128.

Yoshida, S. 1927 Notes on parasitic worms found in large animals died in Osaka. Rigakukai, vol. 25, no. 10, pp. 8-11.

PLATE

ABBREVIATIONS

<i>An.</i>	anus
<i>Ej.D.</i>	ejaculatory ducts
<i>H.Gl.</i>	hook glands
<i>M.G.</i>	midgut
<i>P.c.</i>	parietal cells or unicellular parietal glands
<i>ob.M.</i>	oblique muscles
<i>S.v.</i>	Seminal vesicles, full of ripe spermatozoa
<i>Ut.</i>	uterus

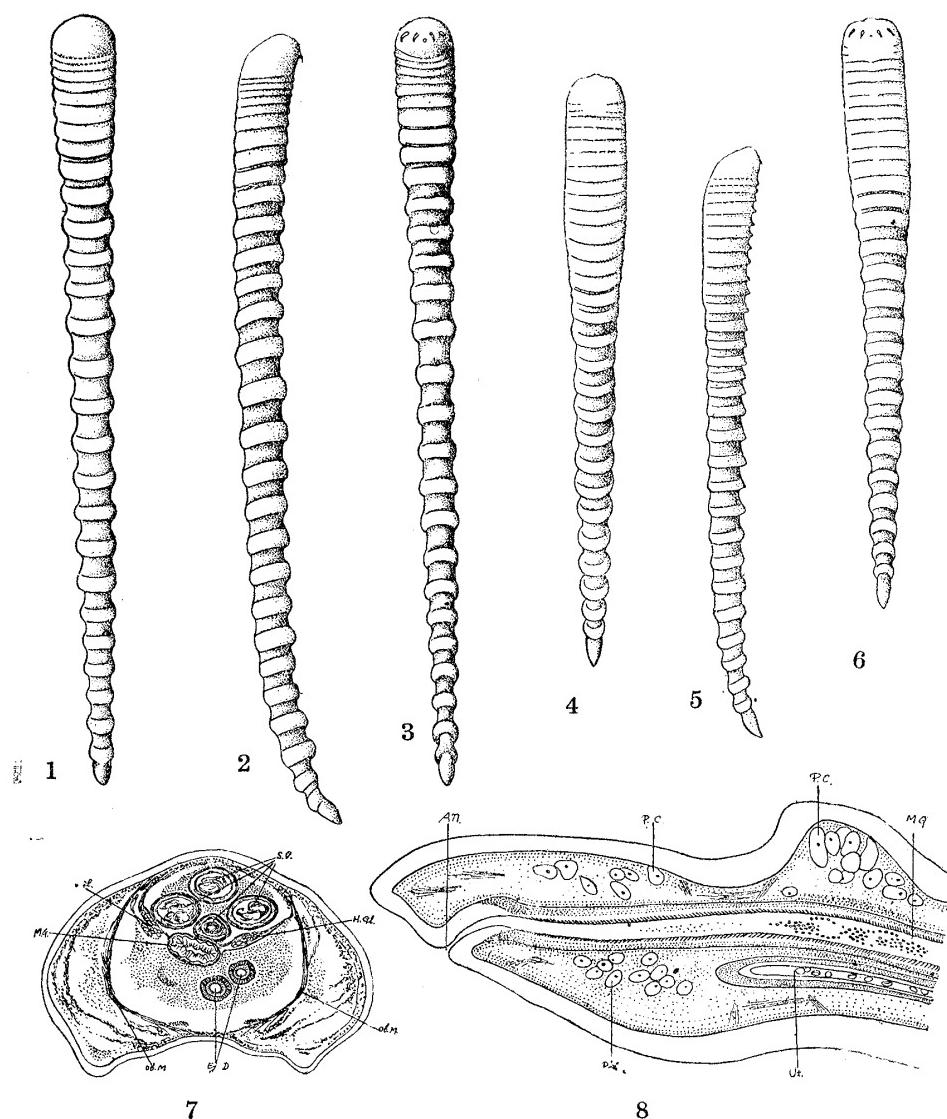
PLATE 1

EXPLANATION OF FIGURES

- 1-3 *Armillifer yoshidai* Kishida n. sp. Dorsal, right side and ventral views of the holotype, female.
- 4-6 *Armillifer yoshidai* Kishida n. sp. Dorsal, right side and ventral views of the allotype, male.
- 7 Transverse section through a male *Armillifer yoshidai* at the anterior part of the abdomen. Camera drawing. As the seminal vesicles bends on itself, it is cut twice.
- 8 Sagittal longitudinal section through the posterior part of a female *Armillifer yoshidai* showing the alimentary tract, uterus containing eggs and the so-called parietal gland-cells which occupy only the subcuticular region of annuli. Camera drawing.

ARMILLIFER YOSHIDAI
KYUKICHI KISHIDA

PLATE 1



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